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Sharing your passion for making jewelry.
Products. Service. Know-how.

Magnetic Stirring Systems with Heat

335-212 Digital Ceramic Magnetic Stirring System with Heated Stand

335-211 Ceramic Magnetic Stirring System with Heated Stand

335-210 Steel Magnetic Stirring System with Heated Stand

Please read all information contained in this handbook carefully before use, and follow all operating and safety instructions and safety recommendations.

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Preface

Congratulation on your purchase of a Ceramic Magnetic Stirring System. All users of this equipment should read this handbook carefully, follow the instructions and procedures, and beware of all the cautions when operating this equipment.

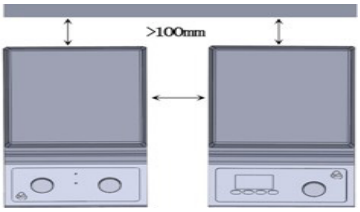
Manufacturer's Warranty

You have purchased this magnetic stirrer with a good faith warranty. This equipment is warranted to be free from defects in materials and workmanship, under normal use and service, for a period of 12 months from the date of invoice. The warranty is extended only to the original purchaser. It shall not apply to any product or parts which have been damaged due to improper installation, improper connections, misuse, accident or abnormal conditions of operation. For claims under the warranty, please contact us.

1 Safety Issues

	Connect the device to a grounded power supply according the spcifications given in this handbook to ensure the safe operation of machine.
	NEVER use this equipment with flammable, explosive, poisonous, or strongly corrosive materials or for any purpose for which it is not intended.
	Make sure that this equipment is set up on a level, sturdy, non-flammable surface.
	Only trained technicians should attempt to disassemble or perform repair work on this equipment; DO NOT ATTEMPT such work yourself.
	Keep all flammable materials well away from the equipment to prevent accidental fire and/or heat damage to materials and/or the equipment.
	Make sure to thoroughly dry the outside of the beaker and use care to avoid heat settings that could cause the beaker to melt and cause a fire.
	Overfilling the beaker will cause overheating of the internal component and could result in a fire and/or damage to the equipment.
	Anytime the machine operating, its top, window and exhaust port of the device will be hot; DO NOT TOUCH these areas in order to avoid high-temperature burns.
	Read this instruction handbook thoroughly before using the equipment.

- When working, wear personal protective equipment such as an apron, gloves, a respirator and safety glasses to avoid the risk injury caused by splashing, evaporation of liquids and/or the release of toxic or combustible gases.
- Set up this equipment in a spacious area on a clean, dry, non-slip, stable and fireproof surface that is level; do not operate the equipment in explosive atmospheres, with hazardous substances, or under water.
- Increase speed gradually, and reduce the speed if the stirring pellet is unable to stay in motion at the center of the beaker, the equipment is not running smoothly, or the beaker is moving on the base plate.
- Temperature must always be set at least 25°F/77°C lower than the flash point of the solution being used.
- Beware of hazards due to flammable material or solution with a low boiling temperature, overfilling the beaker, and/or a damaged beaker.
- The stirring pellet is Teflon® coated; if this equipment is used for purposes other than plating or e-coating jewelry pieces, please be aware that highly acidic or alkaline solutions may cause corrosion in the pellet.
- Examine the equipment and accessories for damage before each use.
- Do not use damaged components. Safe operation is only guaranteed with the accessories described in the “Accessories” section. Accessories must be securely attached. Always disconnect the plug before fitting accessories onto the machine.
- Ensure that the external temperature sensor is inserted into the solution to a depth of at least 20mm.
- When using metal beakers or vessels, do not place the temperature sensors on the bottom of the vessel. Doing so can cause the temperature reading to be inaccuratley high—especially in solutions which have poor conductivity. The tip of the measuring sensor must be at least 5mm from the vessel bottom, and a distance of 10mm is ideal.
- The equipment should only be disconnected from the main power supply by removing the main plug from the wall.
- The voltage printed on the label must correspond to the main power supply.
- Ensure that the main power supply cable does not touch the heating base plate. Do not cover the magnetic stirring machine.
- Keep away from high magnetic fields.
- Observe the specified minimum distances (min. 100mm) between the machine, all other equipment, the wall and any fitments you may have above the machine.



2 Proper Uses

The magnetic stirrer is designed for mixing and / or heating liquids in schools, laboratories or factories. This device is not suitable for using in residential areas or other constraints mentioned in Chapter 1.

3 Inspections

3.1 Receiving Inspection

Unpack the equipment carefully and check for any damage which may have occurred during transport. If there is damage, please contact Rio Grande for technical support.

⚠ **Caution!** If there is any apparent damage to the system, DO NOT plug it into the power line.

3.2 Listing of Items

The following items should be included:

Magnetic Stirrer	
Items	Qty
Main unit	1
Power Cable	1
Stirrer bar	1
User Manual	1
Rack with Rods	1
Fuse	1

Please check the magnetic stirrer and appendix with the packing list when you first open the magnetic stirrer packing case. If you find there is something wrong with the magnetic stirrer and the appendix, do contact the vendor or the producer.

4 Trial Run

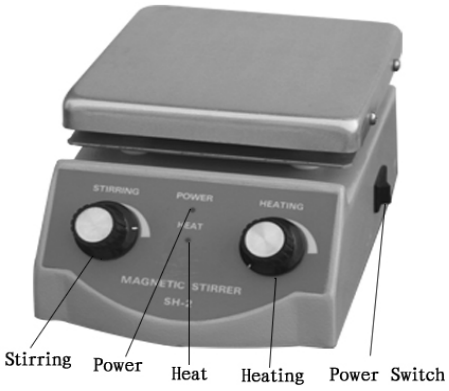
Complete a trial run by performing each of the operations listed below. If these operations are normal, this equipment is ready to operate. If any of these operations are not normal, the equipment may have been damaged during transportation, please contact Rio Grande for technical support.

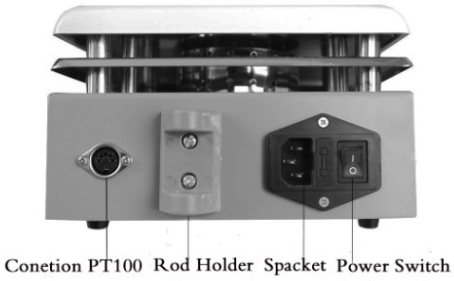
- Make sure the required operating voltage and power supply voltage match.
- Ensure that the socket is properly grounded.
- Ensure that the power is off.
- Plug in the power cable, ensure the power is on and begin initializing.
- Add the medium to the vessel with a stirring bar.
- Put the vessel on the work plate.
- Set the rated stirring speed and start stirring.
- Observe the stirring bar and LCD display.
- Set the rated temperature and start heating.
- Observe the real temperature on LCD display.
- Stop the heating and stirring functions.

5 Control Panel & Operating Modes

5.1 Analog magnetic stirrer with hot plate operation:

- Clean the hot plate, making sure there is no water, dirt and other contaminants on the surface.
- Place the equipment on level worktable, and then put the container with liquid on the hotplate.
- Place the beaker, flask or other container on the hot plate.
- Switch on the power to the machine, then power indicator light will light up; turn the power regulation knob clockwise, the working indicator light will light up. Note that, in the process of regulating, the light intensity changes according to different regulator position, and the temperature rises as well.
- Adjust the speed slowly with the following conditions in mind:
  1) Too high a speed forced the stirring pellet against the beaker walls where it cannot aid in the stirring action (this is called 'breakaway').
  2) Too high a speed causes the beaker to shift position, moving around on the heating plate.
     - Be sure that the power is in accord with the machine specifications.
     - Make sure the power line is a safe distance from the heating plate.
     - Should any kind of malfunction occur, always disconnect the electricity first.
     - When finished, turn off the power and wait for the hot plate to cool to room temperature.





5.2 Digital magnetic stirrer with hot plate operation:

Specifications:

Temperature sensor: Pt100 Thermal Resistive

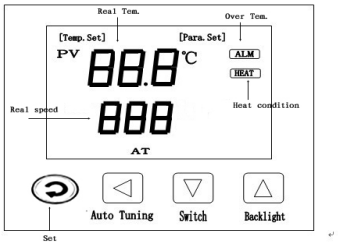
Speed Sensor: Hall Speed Sensor

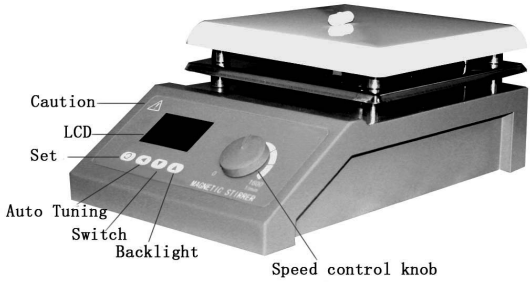
Temperature Setting Range: 0–400°C

Temperature Measuring Range: –10°C to +410°C

The Error of Temperature Measurement: <0.5%

Digital Control Panel





Control Key Definitions:

Use this key when setting or checking the temperature value and inter parameters.

When not in the 'Set' mode, press the key about five seconds to open or close the auto tuning program;
When in the 'Set' mode, press the key to select the value to be set.

Long-press this key to enable the set value to continuously decrease.

When not in the 'Set' mode, press this key to enable or disable the backlight in the normal display status;
When in the 'Set' mode, use this key to increase set value; long-press to enable the set value continuously increase.

Operation and Use of Methods

- On power-up, all symbols are lighted. The controller displays "Lc" on the upper display window and range value on the lower display window. After three seconds, the controller will go into normal display status.
- Setting the temperature:

  Press" "to enter the 'Set' mode. The controller displays "SP" on the upper display window and the current set value on the lower display window. Using the arrow keys (" ", " ", " "), change the value to the setting that you want. Press " " again, the controller will exit the 'Set' mode, and new value will be auto-saved.
- Over-temperature alarm:

  Should the temperature get too high, there is an over-temperature alarm built into the stirrer. A buzzer sounds and the "ALM" indicator lights up on the display. If the over-temperature alarm is caused by a set value, the alarm indicator lights up, but the buzzer does not sound.

  When the alarm is triggered, the controller will automatically disconnect the heating output.
- Temperature Measurement Abnormal Alarm

  If the controller displays "Er-2" on the upper display window, the temperature has exceeded the measuring range, or the temperature sensor has failed, or the controller itself has failed. In such an event, the controller will automatically disconnect the heating function, the alarm buzzer will sound, and the "ALM" indicator will light up on the display. Please check over the temperature sensor and wiring carefully.
- If the controller displays "SEr" on the upper display window, the temperature sensor has failed. In this event, the "ALM" indicator will light up on the display. Please check the temperature sensor carefully.
- Press any key to silence the buzzer.
- While in 'Set' mode, press and hold any key for one minute to return the display to normal status.

Self-Tuning Function

From the normal display status, the controller will enter the PID auto-tuning program by pressing the "◁" button for five seconds; "AT" identifier flashes, it will not flash when PID auto-tuning program is completed. When the auto-tuning of PID is running, it can be stopped by pressing the "◁" for five seconds again. After the auto-tuning program is over, the group of PID parameters in place will provide the most efficient set-up for the machine.

The Internal Temperature Parameters Setting

In normal displays status, press "↻" for three seconds; the controller will show "Lc" on the upper half of the display window and the password value is displayed on the lower half of the display window . Using the arrow keys ("◁", "▽", "△"), change the password value. Press "↻" again; if the password value is correct, controller will automatically enter the internal temperature parameters mode. Press "↻" once more, each parameter value can be modified. Then press "↻" for three seconds to exit the internal temperature parameters mode, and each parameter will be auto-saved.

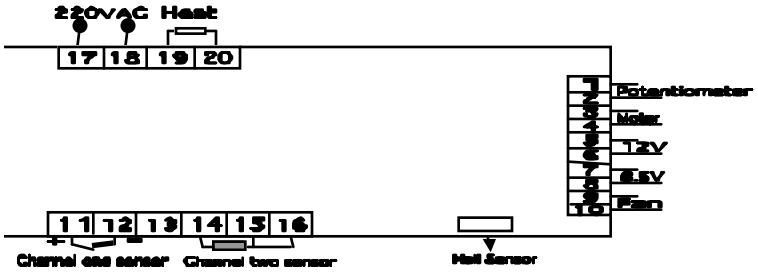
Parameter List One

Parameter indicator	Name	Instruction of the function	Setting range (factory set value)
Lc-	Password	Lc=3, you can enter the parameters listed	0
P-	Proportional	Adjustment of proportional function	(1–rH) 30
I-	Integration	Adjustment of integration function	(1–1000) 200
d-	Differential	Adjustment of differential function	(0–1000) 100
T-	Control cycle	The control cycle of temperature control	(1–60S) 5
rH1	Channel one full-scale value	The maximum temperature setting value	(0–400°C) 400

Parameter List Two

Parameter indicator	Name	Instruction of the function	Setting range (factory set value)
Lc-	Password	Lc=9, you can enter the parameters listed	0
EnS	Sensor Selection	0: Use the first channel sensor control 2: Use the second channel sensor control	(0–2) 0
AL2	Channel two alarm value	The Channel two temperature is beyond "SP+AL2", the ALM indicator lights, the buzzer sounds, the heat output turns off	(0–100°C) 10
Pb2	Channel two zero point adjust	Update the measurement error (zero error) Pb2= actual value – measured value	(-99–99°C) 0
PK2	Channel two full point adjust	Update the measurement error (full error) PK2=1000 x (actual value – measured value) / measured value	(-999–999) 0
rH2	Channel two full-scale value	The maximum temperature setting value	(0–400°C) 400

Wiring



Note: The controller can control the heating load within 1000 Watt!!!

6 Troubleshooting (Faults)

- The equipment can't be powered ON
  —Check to be sure the power cable is plugged in.
  —Check to be sure the fuse is unbroken and securely installed.
- Fault in power on self test
  —Switch the unit OFF, then switch ON to reset the equipment to factory default settings.
- Temperature cannot reach set-point
  —Check to see if the safety temperature value is set too low.
- Stir speed cannot reach set-point
  —Check the viscosity of the solution in your beaker; excessive viscosity may cause abnormal speed reduction of the motor
- Heating cannot be started after setting the temperature, or stirring cannot be started when adjusting the control knob.
  —Check that the control panel is undamaged.

If any fault occurs that cannot be resolved by taking the steps above, try again to reset the equipment to factory default settings (by powering OFF, then back ON). If the fault still exists, please contact Rio Grande for assistance.

7 Working Conditions

Ambient temperature: 5–40°C

Ambient humidity: ≤90%

Voltage: 220V (±10%), 50/60Hz or 110V (+/-10%), 50/60Hz

8 Maintenance and Cleaning

Proper and regular maintenance helps keep this equipment in good working order and lengthens its service life.

- Unplug the power line when cleaning.
- Only use cleaners as advised below. Before using other method for cleaning or decontamination, you must contact the manufacturer and make certain that this method will not damage the equipment.
- Be careful not to spray the cleanser into the equipment when cleaning.
- Wear the proper protective gloves while cleaning the equipment.
- An enameled surface makes the hotplate easier to care for and more resistant to acids and bases; however, the heating plate is also more susceptible to extreme fluctuations in temperature and to impact force which can result in cracking or chipping of the surface.
- The equipment must be cleaned and put it into the initial packaging carton before sending it for service or repair to avoid any contamination from potentially hazardous materials that may have been used with the equipment.
- Operate in a clean, dry room with a stable ambient temperature.

To Remove:	**Use:**
Dyes	Isopropyl alcohol
Construction materials	Water containing tenside/isopropyl alcohol
Cosmetics	Water containing tenside/isopropyl alcohol
Foodstuffs	Water containing tenside
Fuels	Water containing tenside

9 Storage and transportation

- Store this equipment in a clean, dry area with good ventilation and no corrosive gases.
- Secure the equipment during transport to prevent its being exposed to weather such as extreme heat, wind, rain, etc. and to protect it against violent collision while in transit.

10 Main technical parameters

Model	Voltage (V)	Speed (rpm)	Heating Power	Max. Vol. (ml)	Max.Temp. (plate)	Hot Plate size (mm)
SH-4 (analog)	220V/60Hz or 110V/50Hz	100–2000	600	5000	380°C	190 x 190
SH-4C (digital)		100–2000	600	5000	350°C (±10%)	190 x 190

Notes: